

# The Use of Faecal NIRS to Monitor Diet Quality Different Grazing Systems in Tropical Savannas

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# The use of faecal NIRS to monitor diet quality different grazing systems in tropical savannas

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**Key words :** animal nutrition , NIRS , tropical savannas , grazing systems

**Introduction** Nutrition is the major factor influencing animal production in grazing systems , however it is very difficult to monitor in extensive systems . This is especially so in northern Australia which has distinct wet and dry seasons , large paddocks with highly heterogeneous pastures and the likelihood for selective grazing . Faecal NIRS is one method to monitor diet quality in these extensive systems (Givens et al . , 1997) . Here we present data that illustrates the considerable seasonal differences in nutrition across four different grazing systems and discuss this in relation to collection methods and inter-animal variation that occurs .

**Materials and methods** As part of a large paddock scale study investigating aspects of grazing management in the tropical savannas of northern Australia , faecal samples were collected monthly to determine diet quality through NIRS . Grazing systems investigated included set stocking (SS) , set utilisation (SU) , wet season spelling (WSS) and cell grazing (CG) . Twenty fresh faecal samples were ground-collected from each treatment and aggregated , with a representative sample removed , dried at 60℃ for 48 hours and analysed by NIRS . Additional opportunistic collection and analysis also occurred .

**Results and discussion** Figure 1 shows the dietary crude protein figures from the 2004 to 2007 faecal NIRS samples in the different grazing systems . ANOVA analysis showed there was no significant difference between the grazing systems at the 95% confidence level . The main conclusion that can be drawn is that season was the dominant factor influencing animal nutrition .

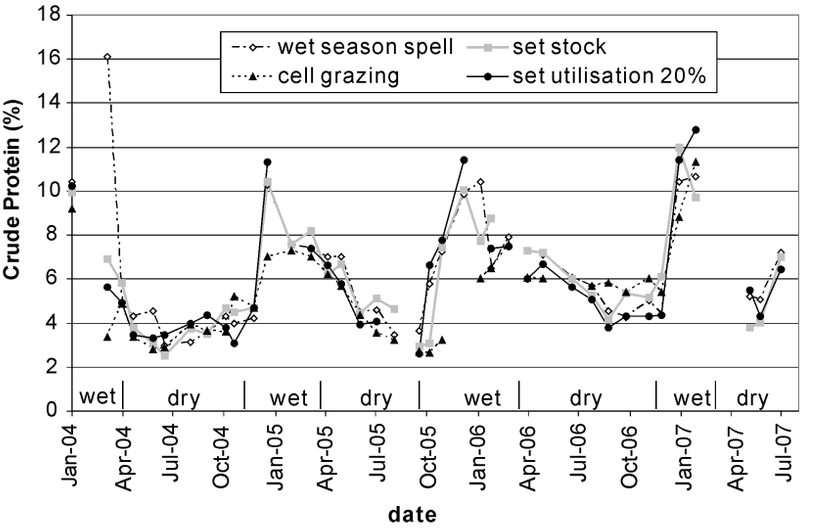


**Figure 1** *Crude protein levels from four different grazing systems .*

The mean monthly figures provided valuable data to inform overall nutrition management . However , by aggregating the samples to provide means alone , the potential value of the data is reduced as no measure of variation is provided .

An opportunistic collection occurred in April 2006 with between 29 to 31 samples collected from cattle within each of the different grazing systems . The samples were not aggregated and means of dry matter digestibility and crude protein were generally similar to the routine monthly samples . However for CG , the mean of the non-grass component of the diet in the opportunistic samples was 20% (range 24%) compared with the routine monthly collection figure of 40% . Across the grazing systems the non-grass component of the diet varied from 20% (WSS) to 50% (SU) . Over the long-term , this observed variability may have proved decisive in differentiating between the different grazing systems .

**Conclusions** Rainfall had a marked influence on diet quality as expected . Across the trial , no significant effect of grazing system on mean diet quality was observed . However , collection and analysis of individual faecal material within each grazing system indicated distinct variations between animals for a number of dietary factors , probably reflecting the variability in individual animal choice of areas grazed within the large paddocks and grazing systems employed . While significantly different levels of available protein were not observed in the different grazing systems , consideration of the variability in other dietary factors may have proved decisive in an analysis of the grazing systems .

**Reference**

Givens , D .I . , De Boever , J .L . and Deaville , E .R . (1997) . The principles , practices and some future applications of near infrared spectroscopy for predicting the nutritive value of foods for animals and humans . *Nutrition Res . Rev* . 10 : 83-114 .